

WHAT IS CLAIMED IS:

Sub. B1
1. An electric power system protection and control system,
comprising:

5 a plurality of protection and control terminals, each for
executing protection and control of an electric power system by
inputting a status quantity; and

10 a power system monitoring and control host connected to
each of said protection and control terminals via a communication
network, for monitoring and controlling an operation of said
power system based on information sent from said protection and
control terminals; each of said protection and control terminals
comprising;

15 correlating means for correlating a cause of operation
with an operation state of a two-way switch operated; and

sending means for sending a result of said correlating
means to said protection and control terminals via said
communication network, respectively; and

20 said power system monitoring and control host comprising;
receiving/displaying means for receiving said result of
said correlating means via said communication network and
displaying said result of said correlating means.

2. The electric power system protection and control system
according to Claim 1, further comprising:

25 relay means for tripping said two-way switch in accordance
with said status quantity of said power system,
wherein said correlating means is provided with,

first judging means for judging whether said two-way switch is opened or closed in accordance with said operation state of said two-way switch;

second judging means for judging whether a relay is operated
5 in association with said two-way switch is opened when said first judging means judges said two-way switch is opened;

first forming means for forming data as said result of said correlating means based on both data of said relay and said two-way switch after said second judging means; and

10 second forming means for forming data as a correlation result, which said two-way switch is opened by a manual operation, when no operation in said two-way switch is judged by said second judging means.

3. The electric power system protection and control system
15 according to Claim 2, further comprising:

re-closing means for re-closing said two-way switch;

wherein said correlating means is provided with,

third judging means for judging whether said re-closing means is operated in accordance with said two-way switch when
20 said two-way switch is judged by said first judging means as not being closed;

third forming means for forming data as a correlation result, in which said two-way switch is operated, when said two-way switch is judged by said third judging means as being closed;
25 and

fourth forming means for forming data as a correlation

result, in which said two-way switch is re-closed by said manual operation, when said third judging means judge that said two-way switch is closed, but said re-closing means is not executed.

4. The electric power system protection and control system
5 according to Claim 2,

wherein said correlating means is provided with,

fourth judging means for judging whether said relay is operated;

fifth judging means for judging whether said two-way switch
10 is re-closed within a fixed time corresponding to said relay being operated when said relay is judged as operated by said fourth judging means; and

fifth forming means for forming data as correlation result, in which said two-way switch is failed to trip, when said two-way
15 switch is judged as not re-closed within the fixed time by said fifth judging means.

5. The electric power system protection and control system
according to Claim 3,

wherein said correlating means is provided with,

20 sixth judging means for judging whether said re-closing means is executed;

seventh judging means for judging whether said two-way switch is re-closed within a fixed time when said sixth judging means judge said re-closing means is executed; and

25 sixth forming means for forming data as a correlation result, in which said two-way switch is failed to be re-closed, when said

seventh judging means judge that said re-closing means is executed within a fixed time, but said two-switch is not closed.

6.The electric power system protection and control system according to Claim 3,

5 wherein said correlating means is provided with,

eighth judging means for judging whether said two-way switch is re-tripped when said third judging means judge that said two-way switch is closed and said re-closing means is executed; and

10 seventh forming means for forming data as a correlation result, in which said two-way switch is failed to be re-closed, when said re-closing means is re-tripped within fixed time as judged by said eighth judging means.

15 7.The electric power system protection and control system according to Claim 6,

wherein said correlating means is provided with,

20 eighth forming means for forming data as a correlation result, in which means said two-way switch is re-closed, when said two-way switch is not re-tripped within the fixed time as judged by said eighth judging means.

8.The electric power system protection and control system according to Claim 1,

wherein said sending means is provided with,

25 converting means for converting data sent by said correlating means into converted data based on a predetermined format;

sending means for sending said converted data to said receiving/displaying means via a communication network, wherein said receiving/displaying means is provided with,

first receiving means for receiving said converted data
5 from sending means; and

displaying means for displaying said correlation result based on said converted data.

9. The electric power system protection and control system according to Claim 1,

10 wherein said correlating means makes at least one of operation time, two-way switch name, direction of operation, and operational area, related to said two-way switch name, as the correlation result.

Sub. Br. 10. A program storing medium readable by a computer, the medium
15 storing a program of instructions executable by said computer to perform methods steps for an electric power system protection and control system, comprising:

a plurality of protection and control terminals, each for executing protection and control of an electric power system by
20 inputting a status quantity; and

a power system monitoring and control host connected to each of said protection and control terminals via a communication network, for monitoring and controlling an operation of said power system based on information sent from said protection and
25 control terminals;

said method comprising the steps of:

correlating an operation of a two-way switch with the cause of the operation; and

5 sending a result of said correlating steps to said power system monitoring and control host via said communication network, respectively.

11. The program storing medium according to claim 10, wherein:

executing correlating means steps comprising:

10 executing first judging means step for executing said first judging means for judging whether said two-way switch is opened or closed in accordance with a operation of said two-way switch;

executing second judging means step for executing said second judging means for judging whether relay is operated in association with said two-way switch is opened when said first judging means judge that said two-way switch is opened;

15 executing first forming means step for executing said first forming means for forming data as said result of said correlating means based on both data of said relay and said two-way switch after said second judging means; and

20 executing second forming means step for executing said second forming means forming data as a correlation result, which said two-way switch is opened by manual operation, when no operation in said two-way switch is judged by said second judging means.

Sub B3 25 12. An electric power system protection and control system, comprising:

a plurality of protection and control terminals, each for

executing protection and control of an electric power system by inputting a status quantity;

a power system monitoring and control host connected to each of said protection and control terminals via a communication network, for monitoring and controlling an operation of said power system based on information sent from said protection and control terminals; each of said protection and control terminals comprising:

a correlation circuit to correlate a cause of operation with an operation state of a two-way switch operated; and

a correlation result transmission circuit to send a result of said correlation circuit to said protection and control terminals via said communication network, respectively;

said power system monitoring and control host comprising;

a correlation result reception unit to receive said result of said correlation circuit; and

a CB operation display unit to display said result of said correlation received by said correlation result reception unit.

13. The electric power system protection and control system according to Claim 12, further comprising:

a protective relay circuit to trip said two-way switch in accordance with said status quantity of said power system;

wherein said correlation circuit is provided with a CPU,

said CPU comprising: a first judging unit judge whether said two-way switch is opened or closed in accordance with said

operation state of said two-way switch;

a second judging unit to judge whether a relay is operated in association with said two-way switch is opened when said first unit judges said two-way switch is opened;

5 a first forming unit to form data as said result of said correlation result transmission circuit based on both data of said relay and said two-way switch after said second judging unit; and

10 a second forming unit to form data as a correlation result, which said two-way switch is opened by a manual operation, when no operation in said two-way switch is judged by said second judging unit.

14. The electric power system protection and control system according to Claim 13, further comprising:

15 a re-closure circuit to re-close said two-way switch, wherein said correlation result transmission circuit is provided with a CPU, said CPU comprising: a third judging unit to judge whether said re-closure circuit is operated in accordance with said two-way switch when said two-way switch is judged by said
20 first judging unit as not being closed;

a third forming unit to form data as a correlation result, in which said two-way switch is operated, when said two-way switch is judged by said third judging unit as being closed; and

25 a fourth forming unit to form data as a correlation result in which said two-way switch is re-closed by said manual operation, when said third judging unit judge that said two-way switch is

closed, but said re-closure circuit is not executed.

15. The electric power system protection and control system according to Claim 13,

wherein said correlation result transmission circuit is
5 provided with a CPU, said CPU comprising:

a fourth judging unit to judge whether said relay is operated;

a fifth judging unit to judge whether said two-way switch is re-closed within a fixed time corresponding to said relay being
10 operated when said relay is judged as operated by said fourth judging unit; and

a fifth forming unit to form data as correlation result, in which said two-way switch is failed to trip, when said two-way switch is judged as not re-closed within the fixed time by said
15 fifth judging unit.

16. The electric power system protection and control system according to Claim 14,

wherein said correlation result transmission circuit is provided with a CPU, said CPU comprising:

20 a sixth judging unit to judge whether said re-closure circuit is executed;

a seventh judging unit to judge whether said two-way switch is re-closed within a fixed time when said sixth judging unit judge said re-closure circuit is executed; and

25 a sixth forming unit to form data as a correlation result, in which said two-way switch is failed to be re-closed, when said

seventh judging unit judge that said re-closure circuit is executed within a fixed time, but said two-switch is not closed.

17.The electric power system protection and control system according to Claim 14,

5 wherein said correlation result transmission circuit is provided with a CPU, said CPU comprising:

 a eighth judging unit to judge whether said two-way switch is re-tripped when said third judging unit judge that said two-way switch is closed and said re-closure circuit is executed; and

10 a seventh forming unit to form data as a correlation result, in which said two-way switch is failed to be re-closed, when said re-closure circuit is re-tripped within fixed time as judged by said eighth judging unit.

18.The electric power system protection and control system
15 according to Claim 17,

 wherein said correlation result transmission circuit is provided with, a eighth forming unit to form data as a correlation result, in which means said two-way switch is re-closed, when said two-way switch is not re-tripped within the fixed time as
20 judged by said eighth judging unit.

19.The electric power system protection and control system according to Claim 12,

 wherein said correlation result transmission circuit is provided with, a converting unit to convert data sent by said
25 correlation circuit into converted data based on a predetermined format; and

a sending unit to send said converted data to said correlation result reception unit via a communication network,

wherein said correlation result reception unit is provided with, a first receiving unit to receive said converted data from

5 sending unit; and

a displaying unit to display said correlation result based on said converted data.

20. The electric power system protection and control system according to Claim 12,

10 wherein said correlation result transmission circuit makes at least one of operation time, two-way switch name, direction of operation, and operational area, related to said two-way switch name, as the correlation result.